1915

IMPERIAL ... OGICAL
4 APR. 1933
INSTIT...

COLONY AND PROTECTORATE OF NIGERIA

REPORT

ON THE

Agricultural Department

FOR THE YEAR

1931

NIGERIA :

Printed by the Government Printer at the Government Printing Department, Lagos.
To be purchased from the C.M.S. Bookshop, Lagos, and from the Crown Agents for the Colonies, 4 Millbank, Westminster, London, S.W. 1

1932

Price - - Two Shillings and Sixpence net

COLONY AND PROTECTORATE OF NIGERIA

REPORT

ON THE

Agricultural Department

FOR THE YEAR

1931

NIGERIA :

Printed by the Government Printer at the Government Printing Department, Lagos.
To be purchased from the C.M.S. Bookshop, Lagos, and from the Crown Agents for the Colonies, 4 Millbank, Westminster, London, S.W. 1

1932

Price - - Two Shillings and Sixpence net

TABLE OF CONTENTS.

	Paragraph.
Staff	1
Locusts	6
Cotton in the Northern Provinces	16
Ginger	18
Mixed Farming	21
Experiments at Zaria and Kano Farms	28
Experiments with Stock	30
The Irrigated Farm near Sokoto	32
The Rice Mill	35
Benue Province	36
Ilorin Province	37
Work of Botanists at Zaria	38
Work of Chemists at Zaria	39
Cotton in the Southern Provinces	40
Palm Oil Presses	42
Oil Palms	44
Kola	47
Cocoa	48
Fruit Export	53
Produce Inspection	56

Annual Report on the Agricultural Department, Nigeria, 1931.

Staff Changes.

1. The staff of the department has been considerably reduced during the year. Except in the Produce Inspection Section, very few actual retrenchments were necessary; the reduction was mainly effected by not filling vacancies that resulted from transfers on promotion, resignations and retirements.

Present Staff.

2. Except in the Produce Inspection Section, the nominal strength has not been reduced. The table below shows the actual staff of the department as it was at the end of 1930, and as it is now, or will be within a few weeks, when all the retrenchments are complete :—

	1931-2.	1932-3.
Senior Administrative Grade	6	3
Superintendents of Agriculture	36	32
Mycologist	1	—
Entomologists	2	2
Chemists	7	3
Botanists (*i.e.* Plant Breeders)	4	5
	56	45
Produce Inspection—European Staff ...	24	14
	80	59

Result of the Reductions.

3. It should be noted that although the number of Superintendents of Agriculture was still 32 at the end of the year, a further reduction to 30 is to be effected, if more posts become vacant through ordinary causes. It is hoped, however, that conditions may improve before that point is ever reached. The present staff of three senior administrative officers is inadequate, and further calls on the cadre of Superintendents of Agriculture have to be made to provide officers to officiate in some of these posts, or to do part of this work. The extension work in several areas and subjects, after several years of spade work, was just reaching the turning point, where progress begins on a considerable scale. It was therefore decided, when retrenchment was called for, that the right course was not to lessen the intensity of our efforts in those most promising areas and subjects, nor to discontinue any experimental work in which continuity is particularly essential; but, instead, to give up all work entirely in less promising areas and in subjects in which continuity is less essential. Accordingly the station at Badeggi, Niger Province, has been closed entirely, and also all work on annual crops has been stopped at Benin. At the latter station only one officer is now stationed. He supervises the harvesting of the experimental oil palms, which are just beginning to fruit, but is mainly engaged in the extension of the planting of oil palms and the improvement of palm groves in the district. The

work at the new station at Nkwelle, near Onitsha, has been restricted in the same way; and that on annual crops at Ilorin and Umuahia has been reduced. Thanks to these measures, it has been possible, as will be seen from the detailed accounts below, to devote such effort to the more promising lines of extension work as to achieve useful results, and to ensure still more considerable extension in 1932 and hereafter, in spite of a reduction of the total estimates of the department from £141,000 to £104,000.

Work of the Specialists.

4. The most important work with which the Mycologist had been engaged recently was some field experiments designed to test the practical and economic feasibility of controlling the black pod disease of cocoa. These will be carried on by the botanical section. In the chemical section, all experimental work on palm oil extraction has been suspended, but fortunately the most important work in that subject had been done already. The plant breeders, both at Zaria and Ibadan, are engaged with many important lines of work, which either promise early returns, or which, alternatively, can give no return at all unless they are carried on continuously for many years. Thus, so far from reducing their numbers, it has been necessary, in spite of all the need for retrenchment, to provide for an increase of the section by one.

African Staff.

5. Among the Africans the only retrenchments have been those of a few of the oldest assistants, who had had no proper training and whose capabilities were consequently extremely limited. Most of the assistants who have been trained in the departmental school at Ibadan are doing excellent work, and the future progress of the department depends largely on their continuing to improve, so as to be able to carry out still more responsible duties, without such close surpervision as they still need.

Locust Destruction, Summary of Experience in 1930.

6. The progressive work of the department was again much hindered in 1931, though to a slightly less degree than in 1930, by the necessity for a defensive campaign against locusts. For, although a very considerable campaign of locust destruction was carried out during the rains of 1930, yet, in the dry weather at the end of that year, there were very many more locusts in the country than there had been a year before (*see* paragraph 8 of last year's report). Arsenical poisoned bait was used on a small scale during the latter stages of the campaign in Eastern Bornu and in the Zaria Province. The food crops in the Northern Provinces in 1930 would have been fully normal but for the damage done by locusts; and that damage, though considerable, was not disastrously great. At the time of writing last year's report (*see* paragraph 10), prices of foodstuffs were some 50 per cent above normal. For some months after that, however, they continued to rise. The " danger point " at which the condition of " dear food " begins to pass into that of " partial famine ", was not reached; but it was quite clear that it would be reached in the dry weather of 1931-32 unless damage by locusts should be almost entirely prevented and the rains prove quite adequate. Thus it was evident that a more effective campaign must be attempted in 1931 than had been achieved in 1930.

Campaign of 1931.

7. Experience in 1930 had shown that the only possibility of a more effective campaign lay in the more general use of poisoned bait. It was found that most Native Administration officials had not the initiative, or had not sufficient influence, to induce villagers to carry out effectively the laborious work of trenching and driving. In 1930-31 it seemed that little was done except in the presence of an European. In 1931-32 native officials seem to have been much more efficient, but it was still true that efficiency largely depended on European supervision. It is little exaggeration to say that an officer with a gang of carrier-labourers can do practically as much work per day when using bait, as he can do per week by " trenching " with village labour. Even this, however, is by no means the most important advantage of baiting over trenching. For when the result of giving information about hopper bands is that an European comes along and exhorts all the men of the village to put in two or three long days' work in trenching, the people are reluctant to give notice of the occurrence of hoppers in their neighbourhood. The hoppers often do not do important damage locally, sometimes none at all: true they will grow into flying adults that will do more damage; but that will be to someone else's crop. Why incur hard work? When, however, it is known that the result of giving information is that an European comes along with a gang of labourers and destroys the hoppers with poison, the attitude is generally quite different and information is promptly given.

Preparations for 1931 Campaign.

8. Several Residents showed great, but natural, reluctance to have poison used in their provinces, because of the fear of villagers or stock being poisoned. It was clear that this risk was but small; and that that risk was a lesser evil than the practical certainty of famine in the alternative. Eighty-five tons, and later a further 20 tons, of sodium arsenite were ordered. Naturally every possible precaution was taken, including the distribution of many bottles of antidote, supplied by the Medical Department. It may be mentioned that the list of fatalities in 1931 consisted of one horse, two donkeys, eight cattle and a few sheep and goats; these were mostly, if not entirely, due to extreme carelessness; there were no cases of poisoning among human beings. Arrangements were made for an effective campaign in all those parts of the Southern Provinces, where breeding was believed to be likely to occur, and for a very wide spread campaign throughout the Northern Provinces. An agricultural officer visited each province and organised numerous small " bait factories ". Actually very little breeding occurred in the Southern Provinces; but in the Northern Provinces some 80 or 90 factories were operated. An agricultural officer was posted to each province to initiate the campaign and to assist the Resident in conducting it during the most important period. (Fortunately this period is not simultaneous in all provinces.) Over 30 tons of arsenic were actually used. The quantity of base—chiefly the bran of guinea-corn—which is used with 30 tons of arsenic would amount to about 1,200 tons, which would suffice for poisoning about 35,000 acres, a figure which agrees fairly with the " returns " so far as they go. Calculations based on the returns of numbers and areas of bands trenched, burnt or beaten, brings the total area destroyed by all methods to about 150,000 acres. The returns of bands destroyed by other means than baiting, are by no means complete or reliable; for those methods were commonly employed in the absence of a European

officer; but the figure given seems at least as likely to be an underestimate as the contrary. What this figure means may be more easily appreciated when it is realised that it is equivalent to a square piece of land with sides 15 miles long. This is probably between ten and 20 times the area of the bands of hoppers destroyed in the previous campaign. The agricultural officers who managed the campaign did excellent work, of which appreciation has been expressed by several Residents. The Residents in turn generally gave the officers the fullest assistance and support. Very good work was done by many junior administrative officers and deputed departmental officers. As in the previous year, an especially arduous campaign was successfully carried out in the Bornu Province at the beginning of the second breeding season in the early autumn.

Results in 1932.

9. There is no doubt that some bands of the first generation were allowed to reach maturity in the early part of the season. That is unavoidable, for at that time much breeding occurs in parts of the country which are almost completely devoid of population, so that the hoppers are never reported; but of the second generation, which is bred in the more densely populated, more northerly, provinces, it is believed that few bands of any size reached maturity within our boundaries. Flying swarms again invaded the country during the dry weather, and together with such few as remained of those bred locally, have been flying about the southern half of the country during the dry weather in much the same way as they did last year (*see* paragraph 8 of last year's report). Opinions differ as to the number now in the country as compared to a year ago, for there is no means of forming any reliable estimate. My own personal opinion is that there is only a fraction of the number that there was a year ago. At the moment of writing (March 31st, 1932) the first report of renewed breeding has just been received.

Food Crops.

10. The damage done by locusts in 1931 was completely negligible. An exceptionally large area of food crops had been sown in anticipation of damage occurring, and of consequent high prices; the weather was exceptionally favourable for the grain crops, and in the result food was cheaper after the 1931 harvest than it has been for many years. It is evident that, by the use of poisoned bait, locusts can be quite effectively controlled in this country, if the campaign is adequately organised. In most provinces, for a really thorough campaign, there is needed a staff of about ten officers, and about twice as many in Bornu; but such activity is only necessary for a few weeks in each province. It would hardly be possible to calculate exactly the total cost of the years campaign. Apart from the time of Government officials, it certainly does not amount to more than £2,000 or so, and the gross cost would certainly be under £20,000.

Permanent Breeding Ground.

11. An investigation by Mr. Lean, Entomologist, in this department, of all the records received by the Imperial Institute of Entomology, indicated a very strong probability, amounting almost to a certainty, that the present outbreak of the gregarious phase of the migratory locust originated in the swampy area between Segou and Timbuctoo. After many unavoidable delays in making the arrangements, Mr. Lean has recently gone to that area. It is intended that he should spend several months in investigating the

flora and natural conditions, in order to see if it may be possible, in future years, so to control the numbers of the solitary phase as to prevent an outbreak of the gregarious phase. The status of the shores of Lake Chad in this matter cannot be certainly determined. There is some evidence pointing to its having been only the earliest secondary breeding ground, *i.e.*, that flights of migratory locusts originating in the " Middle Niger " area went directly to Chad and there bred again. On the other hand, the wastes adjoining the lake have a vast population of locusts of several species, including *Locusta migratoria migratorioides*, and it is quite possible that the gregarious phase originated there almost at the same time as in the other area. In either event, it is clear that the Chad area will merit attention in the future if a serious attempt is to be made to prevent another outbreak.

Investigation of the Shores of Lake Chad.

12. Mr. Golding, Senior Entomologist, spent some weeks examining the areas adjoining the British shores of the lake. His preliminary, tentative conclusions are that intensive breeding of locusts and the occurrence of the gregarious phase would only be likely to occur in a belt stretching along about one half, or less, of the shores of British Chad. This belt is not wide, so that, so far as we are concerned, it should not be difficult, if the area is examined every other year or so, and poison used when necessary, to prevent the occurrence of the gregarious phase. The British portion, however, represents only a fraction of the whole shore; and it will be useless to exercise control in that part only, if there are large areas where breeding can occur on the remainder. It is hoped that, unless the French authorities make a similar study themselves of their part of the shores, it will be possible eventually to arrange for it to be made by a Nigerian entomologist. In the dry season of 1932-33, it is proposed that Mr. Golding should continue his study on the British side by making a more intensive study of a small area, in order to endeavour to test the accuracy of the above opinions, which are based on the results of an extensive and somewhat cursory survey. He will also study the red locust *Nomadacris septemfasciata*. He has little doubt that the southern part of the British shore is a permanent breeding ground of that species, and there is some reason to suspect that it may now be approaching the gregarious phase.

Importance of this Subject.

13. It will be realised that the " conclusions " in the last paragraph are still tentative and subject to correction in the light of further observations. And nothing that we may be able to do by way of control in the future will be of value unless all the permanent breeding grounds in West Africa are controlled. But in the East African colonies the infestation by the migratory locust is apparently more serious than that of the desert locust which preceded it; and with their smaller populations, they have not been able to control it as we have done in Nigeria. The records of flights leave little or no doubt that all the migratory locusts in East Africa are descendants of those swarms of the gregarious phase which first arose in the one or two West African permanent breeding grounds that have been mentioned. It is thus evident that every effort is justified to prevent a future recurrence of the gregarious phase in the two areas, where alone it probably occurs. If it can be prevented at all, the cost of so doing will probably average only a few hundred pounds or at the very outside a few thousand pounds a year. Such a figure is negligible compared to the damage done to crops in East Africa, or even to the money that has been spent there in combating locusts.

Conditions Controlling the Movement and Breeding of Locusts.

14. By comparing all available meteorological records with the numerous reports that have been sent in from all provinces of the observation of swarms of locusts and of their breeding, Mr. Lean endeavoured to give more exact expression to the general facts that have been observed about the movements and breeding of the migratory locust in Nigeria. He finds that the general mass movements of the locusts are such that they keep mainly within the area where the mean daily humidity at 9 a.am., (Local Mean Time) is between 60 per cent and 80 per cent; though, as their movements are partly haphazard, some swarms may be found where the mean daily humidity is as low as 40 per cent or as high as 85 per cent. Breeding only occurs when the average daily humidity at nine o'clock is between the limits of 60 per cent and 80 per cent. Moreover, breeding only occurs after the dry season in Nigeria, when there has been a certain amount of wet weather. Judging by these criteria, it is somewhat remarkable that there has not been more breeding in the Southern Provinces. In April the conditions are apparently generally suitable in Oyo Province from Iseyin northwards, in the western part of Abeokuta and of the Colony, in Ondo northwards of Ado-Ekiti, in Benin north of Auchi and in a very considerable belt in the Eastern Provinces. In May the conditions are still suitable in Ogoja to the northward of Abakaliki, Onitsha north of Enugu, and in the most northerly part of Oyo. Even in June there is still a possibility in the last mentioned area. It has been our experience so far, that in spite of the favourable conditions in these areas at the times mentioned, the locusts tend to move away to the north at the beginning of the rains without breeding to any great extent. Again, as regards the humidity of the atmosphere, the conditions over the northern half of the Southern Provinces are suitable from December to February, but fortunately, by the time the locusts return from the north, the rainfall has ceased, and no breeding occurs for this reason. Thus the complete immunity which practically the whole of the Southern Provinces has so far enjoyed, has been due more to the tendency of the locust to move to the north of Nigeria at the beginning of the rains and to remain there so long as the conditions there suit them, than to the conditions in the south. Thus an equal immunity every year cannot be regarded as absolutely certain, even outside the relatively small areas where breeding has actually occurred each year. It is moreover especially important to destroy any hoppers that are produced in the Southern Provinces at the beginning of the rains, as otherwise the flying swarms into which they grow, arrive in the north just at the time when they can do the maximum damage, by destroying young crops when it is too late to replant them.

Sodium Fluosilicate.

15. While the obvious dangers of arsenical bait, that is the dangers of people eating poisoned locusts, stock eating the bait, or water supplies being poisoned, have been shown by experience to be avoidable provided they are thoroughly explained to the people, there still remain grave objections to its use. When using tons of arsenic and hundreds of tons of poisoned bait in a widespread campaign "in the bush", it is impossible to handle it quite as it is handled in a druggist's shop; and there must always be some degree of danger; as for instance of some vessel in which bait has been carried not being destroyed or locked up as it should be when it is

done with, and being subsequently used for the carriage of drinking water. Sodium fluosilicate is reported to be efficient as a locust poison, and has the advantage that bait treated with it, unlike that treated with arsenic, is distasteful to stock. The fact that it is less soluble than sodium arsenite tends to make it a little less dangerous. Moreover, although exact reliable data are not available, it is believed to be somewhat less toxic than sodium arsenite to mammals. A year ago it was cheaper than arsenite. Mr. Golding, Senior Entomologist, therefore devoted some weeks to as thorough a study as possible—there are many practical difficulties in such work—of the relative efficacy of this poison and of arsenite. He found that the hoppers of the migratory locust will not eat a mixture of fluosilicate and guinea-corn bran—which is by far the most practical base in the Northern Provinces on a large scale—unless an attractant is also added. Salt seems to be the cheapest and most practical attractant to use. But the cost of the salt made the fluosilicate dearer than arsenite in remote localities, even at the prices of a year ago; and since then fluosilicate has risen to three times its previous price, so that its cost now compares very unfavourably with arsenite. However, a further trial is to be made this year on a larger scale, because it is felt that the information that will be gained may possibly be of value in the future.

American Cotton in the Northern Provinces.

16. The following tables show the comparison between the season which has just ended and previous years.

Exports of American Cotton (in Bales each of 400 lb. net) and buying Prices (in pence per pound of Seed Cotton.)

Year.	Bales.	Price.	Year.	Bales.	Price.
1915–16	121	1¾d.	1924–25	27,996	3d.
1916–17	433	1¾d.	1925–26	37,356	2½d.
1917–18	855	2½d.	1926–27	16,659	1⅛d. to 1⅝d.
1918–19	2,248	2⅝d.	1927–28	16,316	2⅜d. falling to 2⅛d.
1919–20	3,568	3¾d.	1928–29	24,686	2⅛d. falling to 2⅛d.
1920–21	5,405	4½d.	1929–30	34,389	1·6d. falling to 1·2d.
1921–22	9,883	2d.	1930–31	13,849	Fluctuating between ·5d. & ·8d.
1922–23	11,224	2½d.	1931–32	4,488*	·6d. rising to ·8d.
1923–24	15,683	4d. falling to 3d.			

* Estimate, liable to slight correction.

The amounts purchased in the different parts of the cotton belt of the Northern Provinces, during each of the last five years, were as follows:—

Cotton purchased for Export.

(In Bales of 400 lb. Net weight of Lint.)

	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.*
Zaria:—Bauchi Line	1,578	2,786	3,030	1,124	361
Remainder	1,971	2,094	2,601	543	283
Katsina Emirate South	7,261	9,800	15,253	8,582	3,227
,, North	915	1,880	2,106	273	Nil
Sokoto Province	3,607	7,069	10,227	2,856	589
Kano Province	518	357	425	5	Nil
Niger Province	466	471	747	466	28
Total	16,316	24,686	34,389	13,849	4,488

* 1931–32 Approximate. Liable to slight correction.

The export was thus the smallest since 1919-20. The opening price, $\frac{5}{10}$d. per lb. of seed cotton, was the lowest on record; but it gradually rose as the season advanced and towards the end one firm was paying as much as $1\frac{1}{10}$d. per lb. in some of the markets. A large proportion of the crop was purchased in the local markets for the weaving industry and the price paid was considerably higher than the export price. In some markets the local price was as much as 2d. per lb. " wholesale ". Seed for planting during the coming season is being taken from the dumps more readily than it was last year and there is every indication that next year's purchases will show a considerable increase over those of this year. Owing to the early onset of the harmattan yields were generally low and the quality was not as good as usual. The lint tended to be short and a good deal of immature cotton was marketed.

American Cotton Breeding.

17. After the Jassid attack of last year, and the consequent rejection of strain " D ", the testing of the best strains that had proved immune was continued, and in addition a number of exotic " jassid resistant " strains, chiefly the newer strains of the well known " U4 " of South Africa, were imported for study by the botanical section. Some of these appear likely to give good yields, and possibly one or two may prove to be of sufficiently high quality by our standard, though none appeared very striking in this latter respect. A sufficient quantity of seed of U4 was also imported to plant 20 acres at the Empire Cotton Growing Corporation farm at Daudawa; for it was felt that such a supply of seed might be very valuable in case it should happen that the strains of Allen cotton which had proved resistant in the previous year should succumb this year. Jassids were again numerous but did no appreciable damage to any strains. A local Allen Selection, " L ", which had proved resistant to Jassids in the previous season, and has done well in yield trials so far, has been multiplied at Maigana, and will be further multiplied this year at Daudawa, while its yield will be thoroughly tested on the experimental farms. The lint of this cotton has been valued at as much as $\frac{1}{2}$d. per lb. more than the ordinary Commercial Allen. In view of the immense amount of very thorough effort that has been devoted during the last ten years to the attempt to obtain a strain in which superior quality is combined with sufficient hardiness and yielding power on poor land, it is considered that this strain " L ", if it succeeds on a large scale, will represent the utmost that can be achieved in this way. Now, therefore, the angle of attack will be somewhat changed; and the object will now be to select, or breed, heavier yielding strains, while remaining satisfied with quality similar to that of the " L " strain.

Ginger Extention Work.

18. It was recorded in last year's report (paragraph 24) that ~~11~~ 16 tons of ginger were bought, in the Pagan Districts of Southern Zaria in 1930-31 at a price of $2\frac{1}{2}$d. a pound for grade 3, which grade included almost the whole of the crop. Owing to the fact that no local buyer offered an adequate price, the ginger was bought with money provided by the Zaria Native Administration and sold by the Imperial Institute on behalf of the Native Administration. Between the times of buying and selling, the price in the London market dropped from £65 per ton to £35 per ton for Jamaica number 3 ginger, with which ours is comparable; and in consequence the Native Administration sustained a loss of £62, on a

turnover of £568. But in return the Native Administration obtained their tax, which in this area is paid almost entirely from the proceeds of sale of ginger. The expenses between purchase and sale amounted to some £13 per ton; which seems to be much higher than they should be if the crop were handled by a firm. The report on the 1930-31 crop showed that the quality had again been greatly improved, and the grade 3 of that crop was as good as the grade 2 of 1929-30 and the grade 1 of 1928-29. This improvement has been almost entirely due to better preparation; and it is considered that there is now little room for further improvement in this direction. Further improvement depends upon our growing bolder ginger. The grading, which it has taken us some years to learn to do satisfactorily, is now considered to be standardised; and any further improvement in quality will be represented by an increase in the amount in the higher grades, rather than by an improvement in the lowest grade, as in the past.

The 1931 Crop of Ginger.

19. A local firm offered to buy the 1931-32 crop at the following prices on the railway :—Grade 1, 3½d. per lb.; Grade 2, 3¼d.; and Grade 3, 3d. per lb. The crop was graded by the department, at special periodical markets. The price offered for grade 3 was justified by the price on the London market at that time, but that price again seems to be falling much as it did last year. The difference in value between each grade seems to be really about ½d. per lb., instead of the one-farthing in the above scale of prices. Forty tons of ginger was graded as fit for export and bought. It consists almost entirely of grade 3. Experience shows that boldness depends upon planting " seed " of a bold strain as well as on manuring and cultivation. The exact share played by each of these factors is not yet fully known; but it is certain that if bold " seed " is used and the crop is manured and cultivated, a very good sample can be produced here. One small parcel of planting material imported from the West Indies gave an excellent product at harvest, while others grown under the same conditions were not very satisfactory. A very few markedly superior hands, which it had been possible to select locally, also maintained their quality, though that is inferior to the exotic type just mentioned. When better seed can be obtained and multiplied to replace the ordinary, the whole of this work will be placed on a better footing, for the 1d. per lb. or more which really bold ginger would fetch would make a great difference. The peeling and repeated washings involved in ginger preparation are laborious; but the extra attention involved in the production of a bolder type would be negligible as compared to the increased return.

Future of this Industry.

20. Although a certain amount of ginger is grown in some parts of the Southern Provinces, production for export is as yet restricted to Southern Zaria. The production there is now sufficiently established to justify a consideration of the prospects of further expansion; for some interest in the subject is now being evinced in other districts. So far as our experience goes, we have not yet found reason to believe that the growing of the crop need be limited to any particular part of Nigeria because of the climate or soil; though it would be unlikely to succeed on the very poor, acid, soils, of the Eastern Provinces of Southern Nigeria. The price of unpeeled ginger, such as is exported from Sierra Leone, might be attractive to Nigerian farmers in years when the price is exceptionally high; but its value in London is so low in other seasons that, when all expenses had been deducted, hardly one half-penny per pound could be offered " up country " here. Moreover

the supply of ginger generally, and of unpeeled ginger especially, already tends to exceed the demand rather than the converse. Any stable export industry from Nigeria therefore depends on the ginger being prepared as Jamaica ginger is prepared. This involves no heavy work, but is a somewhat tedious process; and thus it seems that the production of ginger here depends on the work of the preparation being chiefly done by women and children. If the farmer's wife will prepare it, the price obtained, even of the present grade 3 ginger, represents a good daily wage for her. But the crop would hardly be sufficiently profitable if the preparation were to be done by men, certainly not if it is done by men working leisurely on a daily wage. The best opportunity for this industry is in districts where the labour of women and children is not already employed in the preparation of some product that is exported or of which unlimited amounts are very readily sold locally in bulk. There are many such districts. There are also areas in which the " competing industry " is the hand ginning and spinning of cotton and there seems no reason why that industry and ginger preparation should be mutually exclusive. Where the women are engaged in the extraction of palm oil and kernels, or in the cocoa producing districts, ginger production is naturally less likely to be taken up. The possibility of eventually exceeding the comparatively limited world's demand is not overlooked; but the danger is believed to be small. For while it is thought that ginger may become a useful minor addition to Nigeria's list of exports, and of great importance locally in some districts, it does not seem likely, for the reasons given, that it will ever become a very big industry here.

Mixed Farming.

21. The following table shows the numbers of farmers who have adopted mixed farming :—

	Emirate.	Number at end of previous season.	Starting for the first time.	Failures during season.	Remaining at end of season.
1928	Zaria	...	2	...	2
	Kano	...	1	...	1
	Total	...	3	...	3
1929	Zaria	2	1	...	3
	Kano	1	8	5	4
	Total	3	9	5	7
1930	Zaria	3	4	2	5
	Kano	4	9	1	12
	Total	7	13	3	17
1931	Zaria	5	21	2	24
	Kano	12	8	2	18
	Katsina	...	1	...	1
	Sokoto	...	1	...	1
	Total	17	31	4	44

Note :—" Failures " include men who have given up the system from any cause, including death, and are not, in all cases, technical " failures."

Up to 1930, the work was regarded as being still in an experimental stage, for while the practicability and economic soundness of the measures had been tested as thoroughly as possible on our own farms, it was felt that it was necessary to see how a few ordinary individual farmers would get on, and to study their difficulties and the problems that arise for them, before any attempt was made at wide extension. For this reason it was deemed desirable that this system should not yet be generally taken up by district heads or similar people of influence, until a few ordinary farmers had shown themselves successful over a period of years. By the end of 1930, it was clear that the stage when such caution was necessary had passed, and about one half of those who adopted the method during 1930, are Emirs, District Heads or similar persons, though of course in their personal capacity on their own private farms. The adoption of any innovation by such persons is a necessary preliminary to any general extension in the Mohamedan Emirates. During the year, the measures through which the Native Administrations should take up the furtherance of this work have been fully discussed with the Emirs concerned, both severally and also collectively at the Annual Conference of Residents and Emirs at Kaduna.

Native Administration Measures.

22. The following measures have been recommended and are expected to be approved :—

(*a*) The establishment of Native Administration Farm Centres.

(*b*) The establishment of small demonstration farms.

(*c*) A hire purchase system, financed by the Native Administration, by which bullocks and implements are advanced to farmers when necessary, and paid for over a period of a few years.

Farm Centres.

23. The "Farm Centre" is intended to serve as a demonstration; but it is also intended to be the general headquarters and centre of extension work for one administrative district, or an area of perhaps 30 miles radius. It also provides means by which Native Administration mallams can acquire real practical ability; for by this means alone will they win the confidence of farmers. It will generally be a farm of some size, say 40 acres. There will be attached to the farm artisans who will make and repair ploughs and cultivators for farmers. As soon as possible, superior bulls will stand at stud at each such centre. At the centre, farmers' own cattle will be broken to work and the farmers or their sons trained in driving cattle and in the care of cattle. The staff of the centre will also assist farmers in buying cattle and in getting them inoculated; and, so far as they can, give veterinary advice in simple cases. Each such farm will be managed for the first year, or even two years, by a Superintendent of Agriculture; but thereafter it will be managed by the Native Administration official who will be in charge of the extension work in the area served by the farm centre, and of a number of demonstration farms in the neighbourhood. The farm centres are to be financed by the Native Administration and will be entirely Native Administration institutions, not departmental ones. But the department hopes to be able to build an European rest house near each farm, so that the Superintendent of Agriculture in the Emirate can exercise occasional supervision of the work in his capacity of agricultural adviser to the Emir. One such farm

centre was started in 1931, at Kafin Soli, some 40 miles from Katsina. The Emir has taken a keen interest in the farm and has offered many suggestions about its management, most of which were readily adopted. Progress so far is eminently satisfactory and the centre promises to fulfil its purpose admirably. Arrangements are in train for opening more such centres. In addition, the department's experimental farms naturally function to some extent as similar centres for their own neighbourhood.

Demonstration Farms.

24. The demonstration farms are to be one-man units, each managed by a married labourer, with three or four cattle, a plough and a cultivator. It is intended that the labourer should have no assistance except that of his own family, and should only have the simplest, cheapest, buildings, such as any ordinary farmer would put up. It is hoped that there may be several demonstration farms around each Native Administration farm centre; for the demonstration farms should be only ten or 15 miles apart. These are to be simply demonstration farms to demonstrate to the people of the neighbourhood what one ordinary man can do. None of these farms has been started yet; but arrangements are being made to start some at an early date.

Reason for the Demonstration Farms.

25. Demonstration farms have been criticised as being redundant on two counts (a) that the proposed Native Administration farm centres should serve for all demonstration and (b) that the best demonstrator of any new method is an ordinary independent farmer who has already adopted it. The farm centres, however, although they will be so managed as to serve as demonstrations as far as possible, are of limited utility in this respect. Each centre will cost one or two hundred pounds of capital expenditure, so that obviously their number must be limited. It is a good deal to expect of an ordinary small farmer that he should walk in 30 miles or so to an agricultural centre occasionally. It is not to be expected that he will go frequently in the busy season as he needs to do, in order to learn a complete new system of farming. Some cheaper form of demonstration, something that will cost only a few pounds of capital expenditure and nothing in annual expenditure, is needed, so that a demonstration can be brought within a few miles of every farmer. The theory that the best demonstrator of any new method is an independent farmer who has adopted it, is one which has been followed in this department to the limits of its applicability. But even this theory is not of universal application, and it does not apply to mixed farming. Experience has shown that while another farmer who has adopted the new method is the best demonstrator of any innovation that consists of one simple measure, like the adoption of a new variety of seed, or a new method of preparing produce for harvest, the farmer who has recently adopted such a revolutionary and comparatively complicated measure as mixed farming is liable to be a bad demonstrator. For farmers who have recently adopted this new method do not themselves always carry it out sufficiently effectively to be good object lessons at first, while they themselves are still learning. Thus it is found that one man will not make as much use of his cattle as he might do, another will try to cultivate too big a farm with one pair and be unable to weed it enough, another fears that his cattle will be unhealthy if kept in a pen and so fails to make enough manure, another keeps them in a pen but does not use enough bedding, and so on. Thus it is essential that farmers

should be able to see a small farm, which is worked by only one man and his family, having no advantages which they have not themselves, but which is yet a farm where our methods are efficiently carried out as a whole. On the demonstration farms the farmer will be a paid labourer and he will have to do as he is told. Each demonstration farm will cost but a few pounds for capital expenditure and the produce should more than pay the labourer's wage. They will be supervised by the head mallam at the neighbouring farm centre.

The Maigana Colony.

26. The value of such demonstration as is proposed, is shown by the considerable number of farmers in the immediate neighbourhood of Maigana, in the Zaria Province, who have adopted mixed farming and are following our methods thoroughly, and with great profit to themselves. Our experience there also shows how continuous work in one district is eventually rewarded. We have had a farm at Maigana since 1911. The farmers in the vicinity are of an exceptionally enterprising type. Three years ago, it would have appeared that we had had a farm there for nearly twenty years without exercising any influence on the agriculture of the district, beyond the introduction of American cotton. Now we are at last beginning to see the return for the years of patient continuous work done by a succession of officers, who have always made a point of getting into close touch with the individual farmers. In this connection the work of Mr. Vigo, the West Indian Overseer, who has been there for so many years, merits special mention.

African Staff.

27. In order to provide for the staffing of the first Native Administration farm centres, a course of instruction for Native Administration agricultural mallams was held at Samaru, lasting some nine months, and covering the whole of the cropping season. It will be realised that this class was of great importance for our future work; and the matter was not entirely free from difficulty. For on the one hand it was essential that the Native Administrations should send to us young men of high social standing, who will become men of influence in the Emirates; but on the other hand it was essential that they should literally put their hands to the plough, and themselves do every kind of practical work connected with farming and the care of cattle, so as really to learn their work thoroughly. Every effort was therefore made to provide a good course of training and to provide conditions under which such men might be expected to accept the idea of "learning a labourer's work." In the result, the type of man sent in proved to be excellent and they took to the work with enthusiasm. Such a man after a year or two of practical experience as manager of a farm centre under the close supervision of the superintendent, ought thereafter to be able to carry on independently, with only occasional advice and guidance.

Experimental Work at the Zaria and Kano Farms.

28. The work connected with the use of farmyard manure mentioned in last year's report (paragraph 20) has been continued. The objects of this work are to study how to increase the amount of manure that can be made by the few cattle that a small mixed farmer may be expected to keep, and how to make the most economical use of his manure. The points that are being studied are the maximum

amount of bedding that can usefully be employed, the degree of rotting that is necessary, and the benefit or otherwise for a roof over the cattle pen. Each of these factors is inter-related with the others, and each experiment takes two wet seasons—one in which the manure is made, and one in which the result is measured in the yield of the crop to which it is applied. Several years' work will be necessary before conclusions can be drawn; but there are already indications that valuable results are likely to be attained eventually. The problem of the most economical use of the manure involves a series of experiments, testing the relative effect of increasing quantities of manure on each important crop separately and subsequently the effects of the residue in a second year. The relatively very big increase in the yield of guinea corn from such very small dressings as one or two tons of farmyard manure has again been confirmed both at Zaria and at Kano. But except in this one respect, the experiments seem generally to give exactly opposite results at Zaria and Kano; these striking contradictions are no doubt due to the great difference between the two soils. Thus at Kano, in manuring guinea corn, each additional increment of manure gives approximately an equal increment in the crop; but at Zaria the " law of diminishing returns " is strictly applicable at once and increments of manure beyond two tons give but little further increase of crop in the first year, and none at all in the residual effect in the second year. On the other hand, at Zaria, both groundnuts and cotton respond markedly to direct manuring, while direct manuring seems to have no effect on either of these crops at Kano. At both farms guinea corn is found to exhaust the soil very much more than groundnuts or cotton; and the crops following cotton seem to be a little better than those following groundnuts, if the groundnut haulms are removed for fodder.

Experiments in Intensive Cropping.

29. It is evident that when labour is saved by ploughing and thus made available for other purposes, and when manure is available, a more intensive style of farming should be profitable than is commonly followed at present. Therefore at the experimental farms more attention is now being paid to such crops as sweet potatoes and cassava, and also to " inter-cropping ", and the growing of two crops in succession on the same land in the same season. The trials of quick growing fodder crops are being continued with some ground for hope of useful results eventually; and the problems of improving " paddocks " of grass land for grazing, or to yield hay or ensilage, are being attacked. Seed of the best individual grasses is also being collected and planted in farmed plots to study their utility for a rotational grass crop on farms, and the economic feasibility of such a crop. In all this work on grasses and grass land several years' work will be needed before valuable results are likely to be attained.

Experimental Work with Stock in the Northern Provinces.

30. The results of experiments and experience over a period of some three years at Samaru and at the Shika Stock farm (*see* paragraph 21 of last year's report) may be summarised as follows. Extremely poor though the soils are generally in calcium and phosphates, and the grass also during most of the year, yet native cattle here do not suffer from a deficiency of either of these minerals; and the provision of steamed bone meal to grazing cattle has no effect, at any time of the year. It is without effect, not only

on the increase or maintenance of weight by adults, but even on growing cattle and on the milking and frequency of calving of cows. Cattle which receive no food except grazing and which receive no additional minerals at all, will eventually display " pica " to a slight degree; but its occurrence is prevented by an occasional dose of any mineral: common salt, the various kinds of local alkaline earths that are given to cattle by native owners, or bone meal, all seem to serve the purpose. On the other hand, the experiments have proved, as was to be expected, that grazing alone is far from sufficient for maintenance during the worst period of the dry weather. There is little room for doubt that this is simply due to the low energy value of the food; for the additions of minerals to such a diet have no effect in lessening the loss of weight in those months, nor does the loss in weight seem to be particularly due to shortage of protein. This occurrence of an annual period of starvation evidently has very far reaching effects. For instance, purchased " Fulani " cows of all ages, when given " farm diet ", invariably give much better yields in their second lactations than in the first. Again we have a number of young cows which were bought with their mothers as calves " at foot " or *in utero*. These, fed properly on our farms, have matured much earlier than do ordinary native stock, and, with one exception, have all given more milk already than their dams' best lactations. All this seems clearly to be the result of eliminating the annual starvation period during the early years. A few young stock, kept on the stock farm on grazing alone, contrasted so badly with the others in these respects that the experiment has been discontinued after two years. But it is in the reduction of the intervals between calvings that the most important effect of better feeding is seen. Under native conditions, the " service period " after calving is found to be very long with nearly all, if not all, native cows. Most of the purchased cows after being brought on to our farms have partially responded in this respect to better feeding: and the home reared heifers have come into service again from six to eight weeks after calving. There is naturally all the difference, from the economic point of view, between a herd that averages nearly a calf per cow per year; and one that averages a calf per cow per two years; and the average under ordinary nomadic conditions is probably not better than the latter figure.

Future Work.

31. Thus it is clear that the first essential to make cattle keeping more profitable, or for eventually improving the cattle, is to prevent this annual period of starvation. This is primarily a question of providing " long " fodder, either by improving the supply or conservation of such farm by-products as guinea corn leaves and groundnuts haulms, or by making natural grass into hay or ensilage, or by deliberately growing fodder crops for preserving as hay or ensilage. Now that the preliminary experiments have confirmed the fact that this is the most important problem, and that experiments in this subject are not likely to be vitiated by mineral deficiencies, all the problems of maintenance by such means will be studied. They are not necessarily very simple problems: for it has been found, for instance, in one experiment, that grazing plus good grass hay was not enough for maintenance; but it is not yet certain whether this is due to the unpalatability of even the best hay made from natural grass here, or to its low nett energy value. The question of how most cheaply to produce a gallon of milk is the chief problem connected with seeds and grains for cattle feeding, but is of quite secondary importance at present as compared to the

question of maintenance; however, the former problem is also being studied. Meanwhile the breeding work is going on; and since it is found that many purchased cows give less than 100 gallons of milk per lactation while several regularly give 300-350 gallons, there is every prospect of success. It has become clear that mixed farmers would give a high price for good cows; and there is already some demand for the use of our bulls.

The Canal near Sokoto.

32. For the first time it is possible to say that the season's work on the irrigation scheme at Kworre near Sokoto has been fully satisfactory and successful in all respects. The protective bank was maintained intact through the flood and achieved its purpose; the water levels within the bank were successfully controlled according to plan; the regime proved eminently satisfactory to the farmers within the bank, and they obtained good crops; on our own farm we had satisfactory, heavy crops, much heavier than the native farmers ever attain; and, for the first time, our crops of rice were heavy enough to cover the cost of production by hired labour. As a result of the increasing appreciation among the people of the advantages of the canal irrigation, and their increasing confidence in the management of the canal, which is now in the undivided control of the agricultural officers, and as a result also of some steps recently taken by the local administrative staff, there has been continued improvement in the attitude of the local people (*see* paragraph 25 of last year's report). Instead of a few people using little patches of the irrigation land here and there, and using even that but half-heartedly, as was the case three years ago, there is now keen competition for the use of the land and water; and as fast as the agricultural officers can extend the water courses, the land is taken up and cultivated energetically. This change cannot be ascribed solely to any one of the factors mentioned; but it certainly would not have been achieved without the excellent co-operation between the administrative officers and the agricultural staff which has grown up in recent years.

Experimental Work—Rice.

33. The heavy crops of rice, as much as two tons per acre, obtained on the experimental farm, were a result of four factors—the proper control of the water supply that was effected, the use of imported white rice (which yielded nearly twice as much as the local rices on the farm and three times as much as the native farmers' crops), the puddling of the fields, and the practice of transplanting instead of direct sowing. The local farmers are already anxious to take up the imported white rice, and there is every reason to anticipate that it will only be a matter of two or three years before no other rice is grown within the bank. Their adoption of puddling and transplanting, which are essential for maximum yields and for the control of weeds and volunteer and wild rice, will naturally be slower; for puddling practically necessitates the use of bullocks in cultivation. As this is the first season that we have been really successful ourselves, it is encouraging that already some of the farmers are contemplating buying bullocks so as to be able to follow our methods.

Future Work.

34. The dry season cropping of the canal land is undoubtedly highly profitable to the local farmers, and provides an addition to the food supply of Sokoto which will be valuable in ordinary years

and almost invaluable in a time of famine. But the survey made some years ago showed that there is hardly any place where even one more small permanent canal scheme like the present one is possible. But there are clearly unlimited opportunities for projects similar to what the present one becomes in the wet weather, *i.e.*, a basin irrigation scheme for rice growing. The most valuable function of the present scheme is therefore to test and demonstrate the utility of this latter kind of scheme, with a view to the gradual introduction of other similar projects. The presence of the small permanent water supply, and the necessity of laying out the channels for the distribution of that water, lessens the utility of the scheme as a basin experiment. But it has not prevented the facts from emerging, that, if basin schemes are to be effective, it is essential that the people within the bank must use bullocks and must level and puddle their land, transplant their rice and grow the imported variety. There seems reason to hope that in four or five years the farmers within the bank at Kworre will adopt all these practices and thus justify another scheme being laid out to test the profitableness of basin irrigation alone, without any permanent water. In the meanwhile, the most important work at the farm is to reduce to a routine, and to repeat, the methods that have been so successful this year. The officers are therefore able to devote more attention to work outside the farm and canal area, and a start is being made this year with mixed farming extension work. A Native Administration Farm centre is already being started at Gusau; and preparations are being made for one near Sokoto and for one in the Gwandu Emirate.

The Rice Mill.

35. As stated in last year's report, practically no rice was purchased in 1930-31, but the purchases of 1929-30 were milled and sold. 375 tons of rice were milled, but considerable difficulty was experienced in marketing it outside Sokoto, on account of the high cost of motor freight from Sokoto to Gusau; however, it was all sold eventually, though at a small loss. Some 300 tons of paddy have been purchased to date in 1931-32 at an average price of .33d. per lb. as compared with 0.42d. per lb. in 1929-30; and, as greater experience has enabled a reduction to be made in the cost of milling, it is hoped that a small profit will be made on this year's working. Although there are some indications that the rice from the mill may sell more readily this year than last, the great difficulty connected with the mill is still the disposal of the finished rice. This is partly because this is naturally a matter for which a Government department is not a good agency; but mainly because this Sokoto rice is so heavily handicapped by the cost of motor and rail freight as compared to its present chief competitor. Its chief competitor at present is the native prepared rice of the Baro-Wuya-Badeggi district. The produce of that area is admirably placed for rail and river transport. It also has another advantage owing to the fact that this department introduced imported white rice (Guiana Creole) many years ago into that district; and although it is now greatly mixed with native red rice, the white rice has spread throughout the district, and the present mixture is greatly superior to ordinary native rice. It is now clear that the mill would have been, or even would be still, a much better commercial proposition, and much more likely to achieve the object of encouraging the general introduction of rice milling factories into this country, if it had been placed in the " Baro area ". However, if the imported white rice can be extended throughout the small canal area at Kworre, and

kept pure, that will give the mill at Sokoto a much better opportunity; for such rice, when milled in a factory, would compare with the imported kinds.

Benue Province.

36. In the Benue Province both the lines of extension work in connection with benniseed have been continued. They are the eradication of " black benniseed " and the introduction of stooking (*see* paragraph 26 of last year's report). Steady, if slow, progress is also being made in the introduction of green manuring. The replacement of shifting cultivation by this alternative method of maintaining the fertility of the soil is perhaps more badly needed in this province than anywhere else in the country. So far there seems reason to hope that this work will eventually be successful.

Ilorin Province.

37. In the Ilorin Province a certain amount of interest is being evinced in green manuring; but progress in this direction is likely to be so slow that it hardly justifies the continued existence of the experimental farm in the present financial stringency. It has therefore been decided to try mixed farming there, and every effort will be made to test its possibilities as quickly as possible; for if it is not likely to be a success, the station will in all probability have to be closed at an early date. The flock of sheep which was started a year or two ago has suffered very severely from disease, and the losses have been heavy; but it has served a very useful purpose in providing information on which to base future work on the improvement of sheep.

Guinea Corn and Groundnut Selections.

38. The new heavier yeilding strains of groundnuts and guinea corn selected by the botanists (*see* paragraphs 17 and 18 of last year's report) have been multiplied and have been tested on a large scale with results that again confirm their superiority, to the extent of something like 25 per cent over the ordinary unselected seed. Seed of the best strain of guinea corn will be distributed to farmers for the coming season. Work is being continued, which it is hoped will result in the breeding of superior strains of guinea corn for other areas, where the climate is different from that of Zaria. Testing and multiplication of the groundnut selections is to be continued.

Work of the Chemical Section, Northern Provinces.

39. The chemists at Zaria have carried out numerous very useful analyses of cattle foods, excreta and blood in connection with the work on animal nutrition which has been summarized in an earlier paragraph. In addition to this work, and the examination of soils, the main problem that they have attacked in the last three years has been " to ascertain the reason for the remarkably great effect of very small dressings of farmyard manure on guinea corn at Zaria ". For it was felt, as has indeed proved to be the case, that the general knowledge that would be gained in the course of an attack on this problem was bound to be of value to the agriculturists of the department, even if the actual solution of the specific problem should, in itself, prove not to be of great practical significance. So far, it has been shown that the effect is not due to the direct manurial value of the nitrogen and phosphate contained in the manure, for supplies of readily available " mineral " nitrogen

and phosphates, even in quantities much greater than those in the manure, do not have as great an effect; nor does it seem to be ascribable to any action of the manure in rendering the phosphate in the soil more readily available to the plant; and, as might perhaps be expected, the addition to the soil of a quantity of raw trash comparable to the organic matter in the manure, together with a quantity of " mineral nitrogen " equal to that in the farmyard manure, fails to give a result that is comparable to that of farmyard manure. Thus while the reason that the small dressing of farmyard manure causes so big an effect has not yet been ascertained, several possibilities have been eliminated.

Cotton in the Southern Provinces.

40. So far as can be judged, the yield per acre this year in the south has generally been normal; but the acreage planted was greatly reduced on account of last year's low price. The amount of Improved Ishan cotton seed sold in 1931 was only 45 per cent of the amount sold in the previous year. So far this season, buying has proceeded at only 13 markets out of a total of 26 gazetted. Up to March 31st, 300 bales of Ishan cotton have been bought as against 2,142 bales to March 31st last year. No native cotton has so far been bought this year, as against 40 bales to March 31st last year. The amount of cotton bought so far at markets off the railway is negligible. Opening prices this year were rather higher than the general average for last season. Only one change in price, a fall of $\frac{1}{8}$ pence per lb. on March 29th, has occurred since the markets opened. Present prices in pence per pound of seed cotton are $\frac{5}{8}$, $\frac{1}{2}$ and $\frac{3}{8}$ for Ishan grades I, II and III respectively and 7/16, $\frac{3}{8}$ and $\frac{1}{8}$ for Native grades I, II and III respectively. Cotton is being held up in many areas for an improvement in price and, unless that occurs, it is likely that much seed cotton will be stored, and possibly some even not picked from the plants. It is anticipated that the total export of Improved Ishan will be only some 1,000 bales, unless the price rises again considerably.

Grading of Ishan Seed Cotton

41. This season new grading regulations have come into force and the grades for Southern Nigerian Ishan cotton are now in line with those for Northern Nigerian Allen cotton. As a result of the much higher standard now required for Ishan, the percentage of grade I in Ishan cotton this season to March 31st is 16 per cent and grade II 38 per cent, as compared with 97 per cent grade I and three per cent grade II (on the old grading) to March 31st last season. In an effort to stimulate the harvesting of cleaner cotton, as required by the higher standard for Ishan grades, some 400 picking bags have been sold at a price of two pence each to native farmers and middlemen, and seem to have been used to good effect.

Palm Oil Presses.

42. Continued but very slow progress has been made in the extension of the use of presses for palm oil extraction. A few more machines were sold during the year bringing the total in use in the hands of private owners to 31. In addition there are 14 possessed by various Native Administrations, most of which are let out on monthly hire and are in constant use. The improvements in the extraction process, which were worked out last year by one of the chemists, seem to appeal to native extractors and are being adopted slowly. The way in which the owners continue to use the machines

shows that they appreciate their advantages. Most of the owners use their machines to press other people's fruit for a few pence per tin of oil produced, and some clearly have thriving businesses of this kind. This is especially the case in the Newi district in Onitsha Province where progress has been assisted by the practical interest and helpful attitude of a certain Assistant District Officer. The negotiations mentioned in last year's report (*see* paragraph 36) have resulted in Messrs. Duchscher & Co. of Luxembourg producing a press with a capacity for nine gallons of fruit, which is roughly double that of the Culley and Massa presses. The Duchscher press, with sterling at par, would have been saleable locally at about £9. The same firm make a still bigger press with a capacity of 22 gallons which, in similar circumstances, would have been sold at about £13. These prices compare with prices from £15 to £35 for English-made presses of about five gallons capacity. One of each of the sizes of Duchscher press has been tested for several months and several native farmers have expressed a desire to buy them. Unfortunately, before they were ordered, the fall in sterling exchange raised the local prices to over £12 for the smaller press and £18 for the larger; and it was therefore considered wise to advise the suspension of any attempt to sell these machines, pending an improvement of the exchange. Lately the recovery of sterling has been held to justify the ordering of several machines of both sizes for demonstration by the department.

Foreign versus English Presses.

43. There has been some criticism of the proposal that this department should demonstrate a machine of foreign manufacture. But the foreign machine at present exchange costs about £11 as against £15 for the cheapest one of British manufacture, and the disparity of price will increase with any further improvement of sterling exchange. The foreign machine has double the capacity of the British, which would make it better value, even if, instead of being cheaper, it cost half as much again as the British machine. It is, moreover, stronger and better made in the essential parts; and therefore seems likely to stand up to its work better than any of the British machines have done, except possibly the one that cost £35. In these circumstances it is impossible to do otherwise than favour the foreign machine. Naturally if a machine of British manufacture were available, which could bear comparison with the foreign one, we should prefer to " Buy British ".

Palm Grove Replacement Experiments.

44. The yields in the Palm Grove Improvement, or more accurately " Replacement ", experiments are given in the table below. Great efforts were made this year to obtain complete harvesting and recording of all the fruit on these plots, and the figures for 1931 are believed to be accurate. The result is that the average superiority in yield of the cleared plots is 100 per cent, if the Ikparakwa plots, which are exceptional (*see* next paragraph), are left out of the calculation. This is in spite of the fact that, on nearly all the plots, some of the old trees were cut out during the year to give a better chance to the planted seedlings. The seedlings in most plots have come on very well; some had already borne a little fruit before the end of the year. By the end of 1932, on most of the plots, the majority of the young planted palms should be bearing. Wherever this is the case, we hope to induce the owners to cut out the remaining old trees for the benefit of the seedlings; all the old trees ought certainly to be cut out within the next two years. It

may now be said to be proven that, by clearing and thinning a wild grove, it is possible to bring on young seedlings between the old palms, not only without suffering any loss of yield in the early years of the process, but with an increase of yield even before the seedlings begin to bear. For even if there should be a loss of yield during the next year or two, after all the old trees are cut out and before the young planted palms are in full bearing, that loss will be more than offset by the increased yields already harvested. The progress of the seedlings has greatly impressed the owners and their neighbours, and most of the owners are now anxious to thin out the control "bush plots" (thus of course ruining the scientific experiment as such); and, moreover, a few requests have already been received for guidance in thinning more groves. This is encouraging: for we had not expected these "groves" to have any propaganda value until a year or two later than this, when the main benefit of the work will be visible in the heavy yield and easy harvesting of the young planted palms.

SUMMARY OF YIELDS.

Palm Grove Replanting Experiments.

				Yield of Bunches per acre.			
				1928.	1929.	1930.	1931.
				Lb.	Lb.	Lb.	Lb.
Akpabuyo A ...	6 plots, each	1 acre,	in bush...	2,081	2,145	*1,506	1,593
	5 do.	1 do.	cleared...	3,043	4,231	*2,320	4,127
Akpabuyo B ...	6 do.	1 do.	in bush...	2,388	1,828	*1,151	2,102
	5 do.	1 do.	cleared...	2,550	3,307	*1,922	3,812
Akpabuyo C ..	5 do.	1 do.	in bush...	1,086	1,002	*909	1,407
	4 do.	1 do.	cleared...	1,464	2,664	*2,040	3,392
Ikparakwa A ...	4 do.	½ do.	in bush...	2,120	3,058	3,360	3,712
	3 do.	½ do.	cleared...	3,150	4,696	4,842	3,702
Ikparakwa B ...	3 do.	½ do.	in bush...	2,428	2,534	3,490	3,498
	3 do.	½ do.	cleared...	3,030	2,897	3,780	2,826
Azumini ...	5 do.	½ do.	in bush...	1,410	2,704	2,330	3,074
	4 do.	½ do.	cleared...	1,844	2,531	3,068	3,128
Aba A	5 do.	1 do.	in bush...	457	697	605	1,022
	4 do.	1 do.	cleared...	1,035	2,148	2,279	2,851
Aba B	5 do.	1 do.	in bush...	1,401	1,748	1,475	2,469
	4 do.	1 do.	cleared...	2,259	3,007	3,133	4,292
Aba C	5 do.	1 do.	in bush...	1,333	1,456	1,334	2,769
	4 do.	1 do.	cleared...	1,399	2,653	3,087	4,117
Orlu	4 do.	½ do.	in bush...	1,053	1,130	*538	2,732
	3 do.	½ do.	cleared...	1,559	1,846	1,140	3,482
Ekadilor, Benin Province	5 do.	1 do.	in bush...	...	...	1,847	2,515
	4 do.	1 do.	cleared...	...	...	2,571	3,838

* These figures are unreliable owing to imperfect harvesting or recording in 1930.

The Method of Improvement.

45. In a paper dated 1925 (fifth annual bulletin of this department) I calculated, from the records of two acres of wild palms at Moor Plantation, that most of the yield of a natural grove, whether

the undergrowth is cleared or not, is yielded by trees over 30 feet in height. The yield of " Wild Palms " under 30 feet in height in a grove was found to improve considerably when the undergrowth was cleared, but never become nearly equal to that of plantation palms. The palms themselves do not improve substantially in response to clearing; and the yield of such trees even after clearing is less than that of taller trees. It was recommended that some 50 trees per acre, each over 25 feet in height, should be left for a few years to produce fruit, while newly-planted seedlings are maturing. But when we first cleared and thinned the groves, the owners, who did not then really believe in the idea, would not give us a free hand; and in deference to their wishes, we had (except at Ikparakwa) to leave many trees under 25 feet in height, sometimes even actually cutting out good tall trees of 60 feet in height in favour of these shorter ones. Natural groves are so irregular and variable that every plot and tree has to be considered on its merits. Moreover it is not possible, owing to the irregularity of the plots, to express all the results of our experience in figures. But it has become quite clear, from observation of these experiments, that while the principle which I first laid down was right, I did not go far enough; and instead of the retention of the best trees among those over 25 feet in height, in preference to shorter ones, the right principle is to retain the best of the very tall oldest trees. Ideally no trees under 60 feet in height would be retained. A palm under this height, no matter how good in appearance, should be sacrificed rather than any bearing tall palm. The yield of old palms does not increase greatly after clearing, and if we had retained only such tall trees (as was the case at Ikparakwa) we should not have had the great increases consequent on clearing that we have had in the majority of these experiments. But these tall trees are the ones that yield the great bulk of the fruit in an ordinary grove; and if all the shorter palms are cut out, as at Ikparakwa, there is no loss of fruit as compared to the yield before clearing, or to that of control " bush " plots. The cutting out of the shorter palms is necessary, because it has been found that they greatly retard the development of the planted seedlings. It is quite clear from these experiments that the seedling palm is comparatively little affected by the competition of the roots of other plants, excluding, to some degree, grass, but including older palms. But the seedling palm is equally remarkably sensitive to shade; and if it is at all heavily shaded, it will develop slowly and will develop into a bad, thin palm. So sensitive are the seedlings to shade that in the experiments with half acre plots the shade of the adjacent unthinned plots has palpably handicapped the progress of the seedlings in the cleared plots. The light shade given by a sprinkling of tall palms appears to do comparatively little harm in the seedlings' early years; but it is very different with the heavy shade produced by trees of 20 or 30 feet in height. It has been found impossible to prepare complete " instructions for thinning old palms " stating the number per acre to which the old palms should be reduced each year; but in practice it is not difficult to see when more thinning of the tall palms is needed for the benefit of the seedlings. Experience has also confirmed, what was believed at first, namely that it is quite useless to leave little palms which, although still trunkless, have really passed the seedling stage. They will never make good palms with stout trunks. Seedlings with leaves up to four feet in length can be transplanted, and up to this stage, the bigger they are the better. Good transplanted seedlings of this size will begin to bear within three years, if not too densely shaded, and are to be preferred to stunted seedlings left *in situ*.

Native Oil Palm Plantations.

46. There was a considerable increase in the number of new oil palm plots planted by native owners under our guidance in 1931. Towards the end of the year some of the young palms in the plots planted in 1928 and 1929 began to bear a little fruit. This occurrence immediately led to increased interest in this subject; and a considerable increase in the numbers of plots is anticipated in 1932. The " running totals " of the plots planted by the end of each year, are given below. In view of the difficulties which the prospective planter encounters in the communal ownership of land, the lack of capital, and the recent low prices of palm produce, these figures show how much the native farmer is beginning to anticipate the advantages of plantations; I say " anticipate " for as yet only a few of the palms in the older plots are just beginning to bear fruit.

	Number of Owners.	*Number of Plot.*	*Total Area.*
1928 ...	... 9	9	70 acres
1929 ...	... 30	32	180 ,,
1930 ...	... 54	56	266 ,,
1931 ...	... 84	88	377 ,,

Kola.

47. There has been a considerable demand for kola seed since it has been demonstrated on our farms at Benin and Umuahia that this tree will succeed on the soils of the " Benin Sands " type. In the Benin, Onitsha and Owerri Provinces 16 plots totalling between 35 and 40 acres have been established in the last three years. An important production is not to be expected until the next generation of trees, derived from the produce of those now being planted, begins to bear *i.e.*, for 12 or 15 years at least.

Co-operating Cocoa Fermenting.

48. The efforts described in paragraph 32 of last year's report have been continued, in the endeavour to encourage and guide the Cocoa Fermenting Associations (" Farmers' Associations ") of the Oyo and Ondo provinces towards independence, and to make them into self-governing co-operative societies capable of managing their own affairs. These efforts met with a considerable degree of success. In consequence, the numbers of members, the quantity of cocoa handled, the premia obtained, and the financial reserves of the societies, which three or four years ago were all decreasing, are again all improving (*see* table below). Changes have had to be introduced very carefully and gradually, and many difficulties are encountered. These difficulties mainly arise from the election of influential but quite unsuitable persons as officers of the societies or from the inclusion of non-agricultural members, or the unwarrantable exclusion of suitable members. Such mistakes invariably make a society unsuccessful and unpopular; yet a sudden change, too vigorously advocated, is liable to lead to the dissolution of the society altogether or to its independence becoming a mere pretence. But when a society can eventually be induced to reform its constitution and arrange its affairs on a democratic and business-like basis in accordance with the obvious essentials of co-operation, such a reform is always accompanied by renewed interest, activity and success, as has been shown very clearly at Ilesha this year. Most of the societies are now in such a state that they could qualify for registration as co-operative societies under an ordinance of the usual type. This is an important achievement, for when an ordinance is introduced, and when active steps are taken to encourage

co-operation in the more advanced parts of the country, these societies will constitute a nucleus of sound, competent registered societies to provide a demonstration of the advantages of co-operation.

Co-operative Marketing of Fermented Cocoa (Grades 1 and 2).

	Oyo Province.	Ondo Province.	Cameroons.
Total number of active members of societies:—			
1929–30	?	?	750
1930–31	278	450	766
1931–32	337	511	862
Total quantity of cocoa produced, tons:—			
1929–30	155	158	188
1930–31	222	197	132
1931–32	313	253	148
Quantities per member, tons:—			
1929–30	?	?	·25
1930–31	·80	·44	·17
1931–32	·93	·50	·17
Proportion of grade 1 cocoa, *per cent.*:—			
1929–30	59	66	?
1930–31	93	72	?
1931–32	88	97	?
Total cash received:—	£	£	£
1929–30	4,803	4,958	5,504
1930–31	4,064	3,436	2,398
1931–32	5,286	4,477	2,557
	£ s. d.	£ s. d.	£ s. d.
Average price per ton:—			
1929–30	31 0 0	31 8 0	29 5 0
1930–31	18 6 0	17 9 0	18 3 0
1931–32	18 17 0	17 14 0	17 5 0
Average premium per ton over F.A.Q.:—			
1929–30	3 10 6	3 3 6	7 0 0
1930–31	2 12 0	1 17 0	3 0 0
1931–32	2 9 6	2 9 6	3 0 0
Average cost of marketing per ton incurred by societies:—			
1931–32	0 7 4	0 5 9	...
Total reserve of societies:—	£	£	
1930–31	120	90	...
1931–32	192	120	...

Note:—Some of the figures relating to the Cameroons are only approximate.

Need for Legislation.

49. It is considered that the time has arrived when a Co-operative Societies' Ordinance should be enacted. At present all this work depends entirely on the personal influence of the agricultural officer, who acts as "adviser" to the societies, and upon the wisdom of the guidance that he gives. The successful progress of the last two years is very creditable to the officer in charge of this work, but he now needs to be given some power to support his suasion. Moreover it is clear that a society handling (as in one case)

over £3,000 per annum of its members' money needs to have a proper legally defined status and to be brought under compulsory audit. Our experience in this work has shown that there exists among the cocoa farmers, both the " co-operative spirit " and the business ability, on which village co-operation must be based. But it has also been shown that co-operative sale societies will need not only regulation, but also the most careful and detailed guidance for many years. The value of the societies in leading the way in fermenting cocoa is shown in later paragraphs dealing with produce inspection.

Experiments in Black Pod Disease of Cocoa.

50. The incidence of black pod disease in the Western Provinces of Southern Nigeria, which last year attracted so much attention, reverted to a normal or even sub-normal incidence this year in all districts except perhaps the Ife District. A number of experiments has been laid down with the consent of the owners of several small native farms in Ibadan and in Ondo. In these experiments one-half of the farmer's plot has been treated at departmental expense (while the other half remains untreated) on condition that the owner thereafter harvests, ferments and dries his crop on both parts under supervision, and allows it to be weighed before he sells it. The series includes experiments in thinning and pruning without any other treatment, pruning with " thorough sanitation " including the removal of all black pods, " sanitation alone," and pruning and thinning followed by treatment with fungicidal dusts. Owing to the small size, irregular shape, and irregular density of native cocoa plantations, it is impossible to lay out elaborate experiments with numerous plots; and it would need a much larger series of these " two-plot " experiments than we are able to carry out at present to provide data suitable for any statistical treatment. None the less some conclusions have already emerged and are probably correct.

Results of the Experiments.

51. The fungicidal dusts and sprays possibly had a little effect at the end of the season; but so far it appears very unlikely that they will prove, on further trial, to be effective enough for their use to be profitable in this country, much less to be likely to appeal to the native farmer. " Thorough sanitation," much more thorough than could ever be carried out in practice, has had no apparent effect as yet. The timely picking of ripe pods is found to be a factor of the greatest importance. If every pod could be picked directly it is ripe, black pod disease would probably be of very little importance; and even picking as frequently as is really practical, would effect a great improvement. [It seems that delayed picking due to the fall in the price of cocoa considerably increased the incidence of the disease in Ife, etc., in 1930-31.] " Pruning and thinning " has proved unexpectedly efficient in these experiments, and has greatly increased the yield per acre as well as reduced, to some extent, the incidence of the disease. These measures possibly led to some slight increase in insect attack, but not to any serious degree. For the reasons already mentioned, we feel that we cannot rely entirely on the results of so few experiments, encouraging as their results are; and we feel that we must confirm them by more experiments of the same kind. Meanwhile, however, the native farmers are so impressed by these results, as judged by their eyes, that there have already been requests from some of those who live near the site of these experiments for us to guide them in pruning and thinning their cocoa too. We can hardly refuse these requests : for if we refuse, the farmers will do the work without guidance and

do it badly out of ignorance. It appears that, willy nilly, we shall soon be engaged in a somewhat considerable campaign of instruction in pruning and thinning. The yields obtained in these experiments—from 550 to 1,400 lb. of dry cocoa per acre, with an average of about 1,000 lb. per acre—confirm the observation made whenever yields of cocoa have been measured in West Africa, that the yield here is much heavier than in the West Indies.

Cocoa in the Cameroons.

52. The figures relating to co-operatively fermented cocoa in 1931-32 in the Cameroons in the table above are not quite "final," for the season's deliveries are not quite completed yet. It will be seen that the quantity handled per member is only roughly one-sixth of a ton instead of about one quarter of a ton in 1929-30. The reason for this is the expansion of the work into areas where the cocoa is only just coming into bearing. The total quantity handled has lessened in the last two years chiefly because of the recent heavy incidence of black pod disease. The premium has fallen to a normal figure. Efforts are being made to form Farmers' Associations to market their cocoa co-operatively through the Kumba Agricultural Society, which should eventually become a central co-operative society. Our efforts in the Cameroons are very highly appreciated by the people, who realise the excellent and hard work that has been done for them by Mr. Roebuck, their Superintendent of Agriculture. They realise too that it is due to his efforts that the price ordinarily paid for small holders cocoa in that province now bears a fairly reasonable relationship to its market value, instead of being but a fraction of that value. The native cocoa farmers of the Cameroons are very small farmers and are as yet somewhat backward; but there are good cocoa farmers and ambitious men among them. Work is still greatly handicapped by the difficulties of touring, and of the transport of the cocoa. Progress is slow; but the foundations are being laid of both of a valuable native industry of cocoa production and of co-operation.

Fruit Extension Work.

53. Several trial shipments have been made of fresh pineapples to Liverpool, Hamburg and Amsterdam; and regulations were passed to provide for official inspection of such exports. These regulations were necessary because the selection, packing and shipment of the fruit must all be very carefully carried out, or there is no hope whatever of successful export. Ten of these shipments, comprising 271 cases and 1,011 pineapples, consisted of fruit bought from native farmers and shipped on departmental account. When such shipments yielded a profit the bulk of it was distributed among the suppliers of the fruit. Twelve other shipments were made by private individuals and by a co-operative association of farmers, hastily formed for the purpose, which worked under the very close supervision of a Superintendent of Agriculture. Indeed the Superintendent and his staff did most of the work. These private shipments comprised 303 cases containing 1,150 pineapples. Altogether 574 cases containing 2,161 pineapples were shipped by 15 steamers to the end of April, 1932. In these trial shipments the expenses for packing materials, packing, freight and handling and brokers' charges were all very high, amounting roughly to about 1s. 4d. per pineapple, on the average. A firm handling such a trade on a large scale ought to be able greatly to reduce these charges. However, in spite of these high charges, some of the shipments were very successful and, in one instance, the nett returns, omitting the

first purchase price, worked out to as much as 9.4 pence per pine-apple. Some shipments, however, resulted in a loss, owing to the high proportion of the fruit that developed black cores during shipment. It is very far indeed from being the case, as seems to have been assumed by various writers in the public press, that all that is necessary is just to put some Nigerian pines into cool storage on the ships, and conduct a campaign of advertisement to make a market for them in England. Actually we have met with no difficulty in the marketing of the fruit. The difficulty is to place them on the market in good condition. Factors arising from local conditions render it hardly possible for us to follow exactly the methods employed in the export trade from other countries where the pineapples are grown on large plantations. The critical factor for us is evidently connected with the temperature or ventilation of the storage space on the ships. Fruit shipped by certain steamers generally arrives in Liverpool in satisfactory condition, that on other steamers has never done well. By the courtesy of the owners, experiments are now being made at the Lagos Cold Store during the rainy months, which are the " out-of-season " ones for pineapples. It is hoped that these experiments may demonstrate how this black-core trouble may be avoided. It is possible that a good deal of experimental work may be needed before this problem is solved, and eventual success cannot as yet be regarded as certain. If this difficulty proves superable by practicable measures, then the export of fresh pineapples may well become a considerable industry, if taken up by competent exporters. It will be a trade in which great care and efficiency will be essential for any success.

Possibilities for Canning.

54. Pineapples are very easily grown in the Colony and the adjoining parts of Abeokuta, and those which have been exported so far grew practically wild. The native producer would thus be satisfied with a very reasonable price for them. But the cost of transport would probably cause him to need a rather higher price at a factory than is paid for the pineapples that are canned in Singapore. It does not seem impossible that Nigerian tinned pine-apples could compete with Malayan in England; but the opportunity for them does not seem so great as that for fresh pineapples. A canning factory would however be a most valuable accessory for the shipper of raw pines, to make use of his excess fruit, and of his organisation during the intervals between ships. They could at least be sold at a profit in this country to meet a demand that would probably grow with a cheap supply.

Citrus Fruits.

55. Some preliminary trials have been made by sending home to the Empire Marketing Board samples of the fruit of a number of our best selected orange and grapefruit trees. The eventual possibility of a commercial export of grapefruit seems the greater of the two; but it lies some years ahead. For however favourable the reports on the samples may prove, nothing more can be done until large number of grafted trees of the selected type have been distributed to native farmers and brought into bearing. The oranges grown at present are much too irregular in type for an export trade. There would seem to be even greater practical difficulties in the way of an export of citrus fruits than of pineapples when the trade is based on purchasing fruit from innumerable very small and scattered orchards, many of them of a fraction of an acre only in size; and again the difficulties may prove insuperable. In the meantime the internal trade can, and does, easily absorb the increasing supply.

Produce Inspection Inquiry Committee.

56. Produce inspection was transferred to this department on April 1st, 1926, in the Western Provinces, and in the Eastern Provinces in August, 1928. The scheme was originally sanctioned as a temporary experiment for a period of three years. By the beginning of 1931 a review of the situation was already overdue. The financial position of the scheme, which has to be self supporting, needed consideration; for it was already hardly paying its way, without making any provision for a pension fund or provident fund for the inspectors, which was to be introduced if and when the scheme became permanent. Unanimity could not be attained, among the several commercial bodies concerned, as to how this position should be rectified. A committee of inquiry was therefore appointed by the Acting Governor, under the Chairmanship of Mr. W. E. Hunt, C.B.E., to enquire into the whole subject, and to advise upon the question of the continuance of the scheme or to recommend any changes or modifications of any kind that might appear desirable.

The Committee's Report.

57. As is usual in such circumstances, some rather irresponsible opinions were offered and suggestions were put forward, on the spur of the moment, to which their authors had devoted very little consideration. But the consensus of opinion, and consequently the committee's finding, was to the effect that the scheme ought to be continued without modification in any important respect. To meet the financial difficulty it was recommended that, before the fees were increased, the effect should be tried of considerably reducing the number of inspectors. It was held that the standard of efficiency attained hitherto had been, humanly speaking, that of perfection. It was suggested that if the supervisory staff were reduced, and this resulted in some loss of efficiency, the situation would become quite clear to the trade: either the exporters must be satisfied with this new, lower, standard, or, if the old standard is required, higher fees must be paid.

Reduction of Staff.

58. Ten out of 20 inspectors have been retrenched; and the number of the areas which are each supervised by one inspector has been reduced from six to four in the Western Provinces and from eight to three in the Eastern Provinces, with corresponding increases in the size of the individual areas. The changes were cautiously introduced step by step; but, none the less, it was assumed by the producers and middlemen of some districts that there would be a considerable relaxation of the efficiency of the work, and there was consequently an immediate deterioration in the purity of the produce tendered for sale. Some few examiners similarly over-estimated the increased opportunity for bad work to escape detection. Little deterioration occurred in the quality of the produce actually exported, but there was much congestion and temporary difficulty. However, in a few weeks, both the traders and the examiners were disillusioned; and at the moment the work is proceeding as smoothly and effectively as ever. It is perhaps too early to assume that it will continue to do so; but there seems every reason to hope so.

Cocoa Grading.

59. Some witnesses were of the opinion that cocoa should be treated similarly to palm oil and kernels; that is to say that it should be inspected to ensure that it is of a reasonable standard of purity,

but not be graded according to any superiority above that standard. There are important differences between the circumstances affecting cocoa and those affecting the other products which were apparently overlooked by those witnesses. But, even apart from those points, I and the officers of this department, differ from those witnesses on the cardinal question of whether the grading will eventually effect an improvement in the value of Nigerian cocoa as a whole. The system of grading was only rendered really practical in the season of 1930-31, so that when the committee were sitting the question of whether grading had already had any effect could hardly be discussed: the only question really was that of its future effect. The following figures give the percentages of cocoa passed in each of the four grades during the months of October to March inclusive, when the main crop is inspected, in each of the last two years.

	Percentage Passed.	
	Western Provinces, 1930–31.	Western Provinces, 1931–32.
Grade I. Less than 5% insufficiently fermented. Less than 5% defective or germinated	8·5	13·0
Grade II. Less than 10% insufficiently fermented. Less than 10% defective or germinated	14·6	7·6
Grade III. Class C. Less than 20% insufficiently fermented. Less than 8% defective	25·8	24·6
Other Grade III. Any content insufficiently fermented. Less than 8% defective	46·7	53·3
Grade IV. 8%–20% defective	4·4	1·4
Total in tons (approximate)	43,700	50,700

There has been an increase of 2,875 tons in the amount of first grade cocoa, against a decrease of 2,525 in grade II; and a decrease of 1,200 tons in the fourth grade. These changes are believed to be fairly ascribable to the effect of grading. The increase is not yet very great, but is an encouraging improvement in so short a time.

Commercial Aspects of the Grading.

60. The following points may be of interest. The "other grade III" corresponds to "Fair Average Quality." Owing to slight differences in our definitions and judgment of defects in cocoa as compared to that of Liverpool merchants and brokers, the grade I cocoa mentioned above is markedly superior to the general standard of West African "good fermented." It is bought by the local firms at a premium of £1 per ton over "Fair Average Quality," and it is probably generally sold merely as "West African Good Fermented." It ought, however, to be worth rather more. Similarly most, if not all, of the grade II Nigerian cocoa is actually saleable in Liverpool as "Good Fermented," not merely as "Fair Fermented." The grade II cocoa is bought at a premium of 10s. per ton over "Fair Average Quality" and should be very profitable to the shipper. Much of the grade III, class C, is known to be saleable as "Fair Fermented"; and probably this year all of the cocoa of the third grade cocoa which contained less than 15 per cent of insufficiently fermented beans was sold as "Fair Fermented." It is bought at the same price as ordinary "Fair Average Quality," and is probably the most profitable type to the exporter.

Cocoa in Ijebu Province.

61. The average figures for the whole country would be much better if it were not for the unsatisfactory lagging of the Ijebu Province behind the remainder. In that province there is practically no grade I or grade II cocoa prepared. Owing chiefly to lack of staff to undertake the work, we have never introduced into that province the co-operative fermenting work which has proved so effective an educational measure in Ife, Ilesha and Ondo. In consequence, the old vicious circle still revolves there as it previously did in the Oyo Province. There is not enough fermented cocoa available in considerable parcels to induce buyers to offer a premium for it, and without such a premium the producers will not generally produce fermented cocoa, nor middlemen separate any small quantities that may be produced. It is proposed to try to cut this vicious circle next season by introducing co-operative fermenting and sale in that province.

O. T. FAULKNER,
Director of Agriculture.

Ibadan, 21*st May*, 1932.